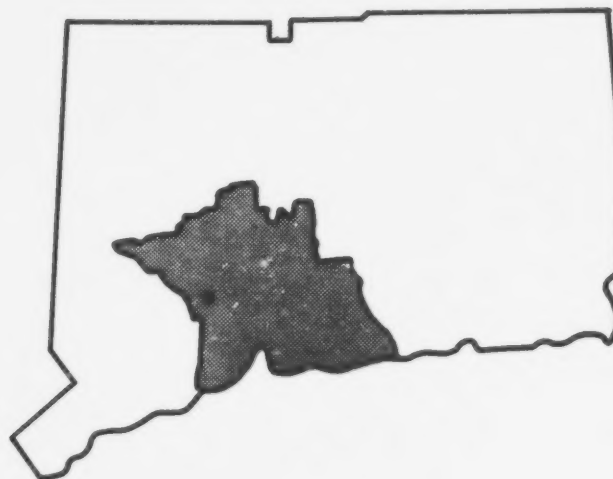


FLOOD INSURANCE STUDY



**TOWN OF
WOODBIDGE,
CONNECTICUT
NEW HAVEN COUNTY**



REVISED

MARCH 18, 1991



Federal Emergency Management Agency

COMMUNITY NUMBER - 090153

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Flood Insurance Study Effective Date: September 16, 1980 (Flood Insurance Rate Map dated March 16, 1981)

Flood Insurance Study Revised: March 18, 1991

TABLE OF CONTENTS

	<u>Page</u>
1.0 <u>INTRODUCTION</u>	1
1.1 Purpose of Study	1
1.2 Authority and Acknowledgments	1
1.3 Coordination	1
2.0 <u>AREA STUDIED</u>	2
2.1 Scope of Study	2
2.2 Community Description	2
2.3 Principal Flood Problems	4
2.4 Flood Protection Measures	4
3.0 <u>ENGINEERING METHODS</u>	4
3.1 Hydrologic Analyses	5
3.2 Hydraulic Analyses	6
4.0 <u>FLOODPLAIN MANAGEMENT APPLICATIONS</u>	7
4.1 Floodplain Boundaries	8
4.2 Floodways	8
5.0 <u>INSURANCE APPLICATIONS</u>	15
6.0 <u>FLOOD INSURANCE RATE MAP</u>	16
7.0 <u>OTHER STUDIES</u>	17
8.0 <u>LOCATION OF DATA</u>	17
9.0 <u>BIBLIOGRAPHY AND REFERENCES</u>	17

TABLE OF CONTENTS - continued

	<u>Page</u>
<u>FIGURES</u>	
Figure 1 - Vicinity Map	3
Figure 2 - Floodway Schematic	9
<u>TABLES</u>	
Table 1 - Summary of Discharges	6
Table 2 - Floodway Data	10 - 14
<u>EXHIBITS</u>	
Exhibit 1 - Flood Profiles	
Bladens River	Panels 01P-04P
Wepawaug River	Panels 05P-06P
Race Brook	Panels 07P-08P
West River	Panels 09P-10P
Exhibit 2 - Flood Insurance Rate Map Index and Street Index	
Flood Insurance Rate Map	
Exhibit 3 - Elevation Reference Marks	

FLOOD INSURANCE STUDY
TOWN OF WOODBRIDGE, NEW HAVEN COUNTY, CONNECTICUT

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Town of Woodbridge, New Haven County, Connecticut. This information will be used by the Town of Woodbridge to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study represent a revision of the original analyses prepared by the U. S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. IAA-H-9-77, Project Order No. 27. The work for the original study was completed in December 1978. The hydrologic and hydraulic analyses in this revision were prepared by the New England Division of the U. S. Army Corps of Engineers under Inter-Agency Agreement No. EMW-84-E-1506, Project Order No. 26. This work was completed in July 1989.

1.3 Coordination

On August 9, 1983, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the town, and the COE (the study contractor) to determine the streams to be studied by detailed methods.

On March 22, 1990, a final CCO meeting was held with representatives of FEMA, the town, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Woodbridge, New Haven County, Connecticut. The area of study is shown on the Vicinity Map (Figure 1).

The following tabulation shows the limits of study for the streams studied by detailed methods.

<u>Stream</u>	<u>Limits of Detailed Study</u>
Bladens River	From the downstream corporate limits to a point approximately 200 feet upstream of State Route 67
Wepawaug River	From the downstream corporate limits to State Route 114
Race Brook	From the downstream corporate limits to State Route 313
West River	From the downstream corporate limits to a point approximately 625 feet downstream of the Lake Dawson Dam

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through July 1988.

All or portions of the following flooding sources were studied by approximate methods: the West River, Black Brook, the Wepawaug River, and Race Brook. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Woodbridge.

2.2 Community Description

The Town of Woodbridge is located in southern Connecticut, in the central portion of New Haven County. It is bordered by the Town of Bethany to the north; the Town of Orange and the City of New Haven to the south; the Town of Seymour and the Cities of Ansonia and Derby to the west; and the Town of Hamden to the east. The Town of Woodbridge is located approximately 40 miles from Hartford and has a population of 8,800 (Reference 1). The total land area within the town is 19.3 square miles, with a population density of 456 persons per square mile.

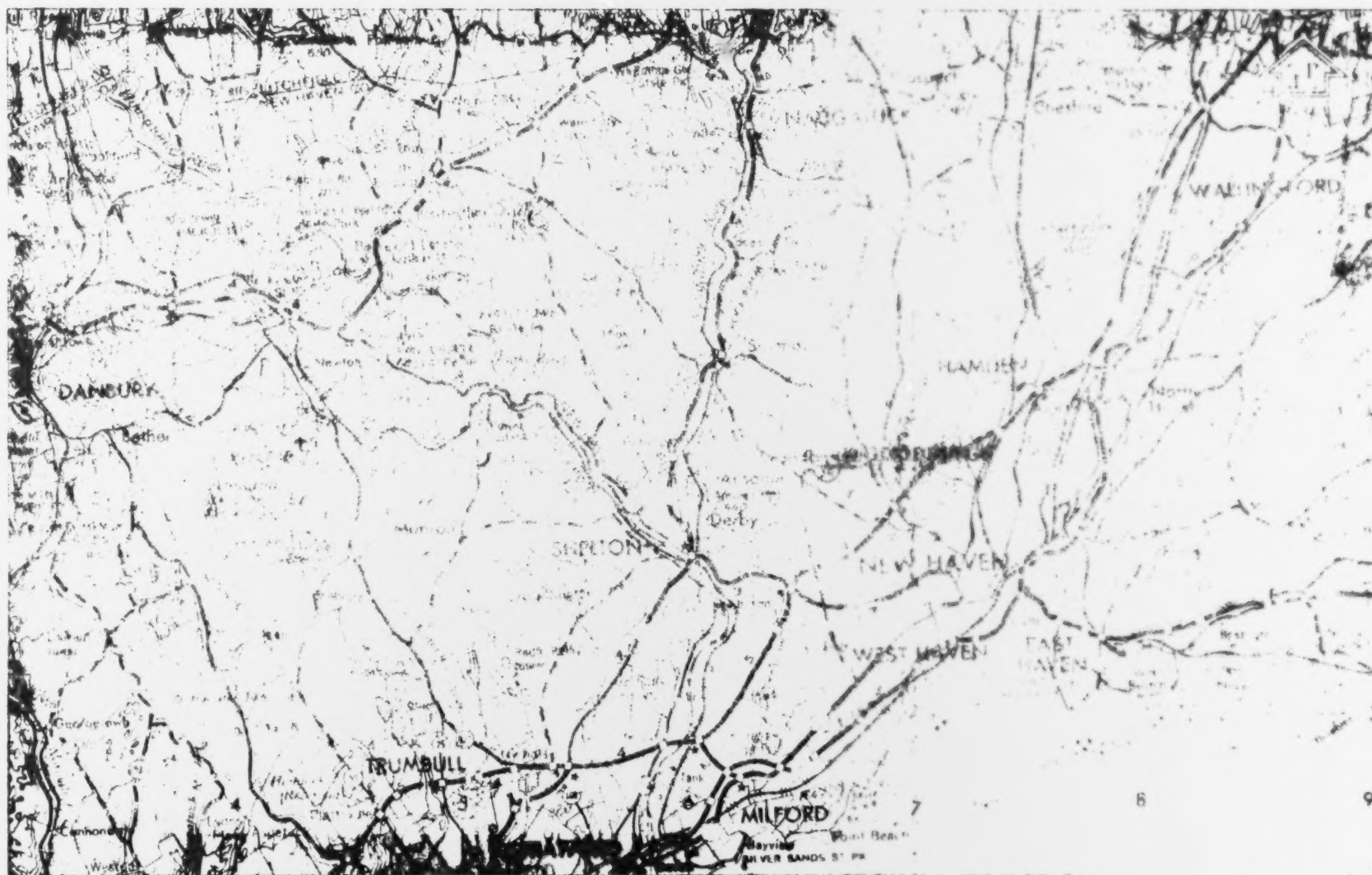


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

APPROXIMATE SCALE

0 1 2 3 4 5 6 7 8 9 10 MILES

VICINITY MAP

The climate of Woodbridge is moderate, and is characterized by an even distribution of approximately 45 inches of precipitation during the year, large ranges of daily and annual temperature, and a considerable variety of weather in short period of time (Reference 2).

The topography of the town ranges from gently rolling terrain in the river valleys to steep, hilly terrain in several upland areas. The Woodbridge land area consists primarily of soil developed on well-drained glacial-stratified drift in the valleys and glacial till and bedrock in the uplands.

The Bladens River and the Wepawaug River, which have drainage areas of 8.87 and 6.92 square miles, respectively, at the downstream corporate limits, are the principal streams in Woodbridge. Race Brook is the major tributary to the Wepawaug River. Continuing development in the basins of these streams is expected, and pressure leading to intensified floodplain use will accompany such development.

2.3 Principal Flood Problems

Floods in the Town of Woodbridge can occur at any time of the year. Spring floods are common and are caused by rainfall in combination with snowmelt. Floods in late summer and fall are usually the result of hurricanes or other storms moving northeastward along the Atlantic coast. Winter floods result from occasional thaws, particularly in years of heavy snowfall.

Major floods of the past 50 years occurred in Woodbridge in March 1936, January and September 1938, January 1949, and August and October 1955. Of these, the hurricane-caused flood of September 1938 was the most severe. Streamflow records at USGS gaging stations in the Woodbridge area indicate that the September 1938 flood was equivalent to a flood having a recurrence interval of approximately 100 years.

2.4 Flood Protection Measures

There are no flood protection projects in Woodbridge at the present time, nor are any planned for the near future.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which

are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

For the Bladens River, the Wepawaug River, and Race Brook, peak discharges of floods of the selected recurrence intervals were determined by regression analysis. Discharges were related to basin characteristics such as drainage area, stream length, streambed slope, and rainfall parameters, as described in a flood flow formula determination for the State of Connecticut (Reference 3).

For the West River in this revision, peak discharges of floods of the selected recurrence intervals were calculated using the Soil Conservation Service (SCS) rainfall-runoff method. This method uses soils and land-use information to develop a runoff curve that relates rainfall to runoff; topography and stream hydraulics from which times of concentration are calculated; and rainfall distribution information obtained from the Weather Bureau. Peak discharges on the West River at Lake Dawson were computed by drainage area ratio.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
BLADENS RIVER					
At corporate limits	8.87	1,250	2,200	2,950	4,450
Upstream of confluence of Hopp Brook	5.51	800	1,400	1,900	2,800
At dam upstream of Bethmore Road	2.39	400	700	950	1,400
At Sanford Road	0.84	160	300	400	600
WEPAWAUG RIVER					
At corporate limits	6.92	850	1,500	1,900	2,900
At Racebrook Road	5.10	600	1,000	1,300	1,900
At State Route 317	2.55	300	500	650	950
RACE BROOK					
At corporate limits	2.26	300	500	630	1,000
WEST RIVER					
At Lily Pond Avenue	16.4	1,150	1,750	2,250	3,200
At Lake Dawson	13.9	990	1,590	1,910	2,720

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analyses of the Bladens River, the Wepawaug River, and Race Brook were field surveyed and located at intervals to evaluate normal channel losses and the effects of all dams, culverts, and bridges located in the floodplains. For the West River, cross sections downstream from Konolds Pond were obtained partly from existing field survey results and partly from a contour map of the area (References 4 and 5). Cross sections upstream of Konolds Pond Dam were taken from the contour map. Bridge data were taken from existing field survey results.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

For the Bladens River, the Wepawaug River, and Race Brook, water-surface elevations of floods of the selected recurrence intervals were computed using the USGS E431 step-backwater computer program (Reference 6). Starting water-surface elevations were obtained from normal depth calculations downstream of the corporate limits.

Water-surface elevations of floods of the selected recurrence intervals for the West River were computed using the COE HEC-2 step-backwater computer program (Reference 7). The starting water-surface elevations were taken from the Flood Insurance Study for the City of New Haven (Reference 8). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of field inspection of the floodplain areas. The following tabulation shows the channel and overbank "n" values for the streams studied by detailed methods.

<u>Stream</u>	<u>Channel "n"</u>	<u>Overbank "n"</u>
Bladens River	0.030-0.037	0.040-0.070
Wepawaug River	0.030-0.035	0.040-0.080
Race Brook	0.030-0.035	0.040-0.075
West River	0.040-0.045	0.040-0.075

Elevations for the streams studied by approximate methods were determined by a USGS regional technique relating the 100-year depth of flooding to drainage area.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 9).

For the streams studied by approximate methods, the 100-year floodplain boundaries were delineated using the previously printed Flood Insurance Study for the Town of Woodbridge (Reference 10).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

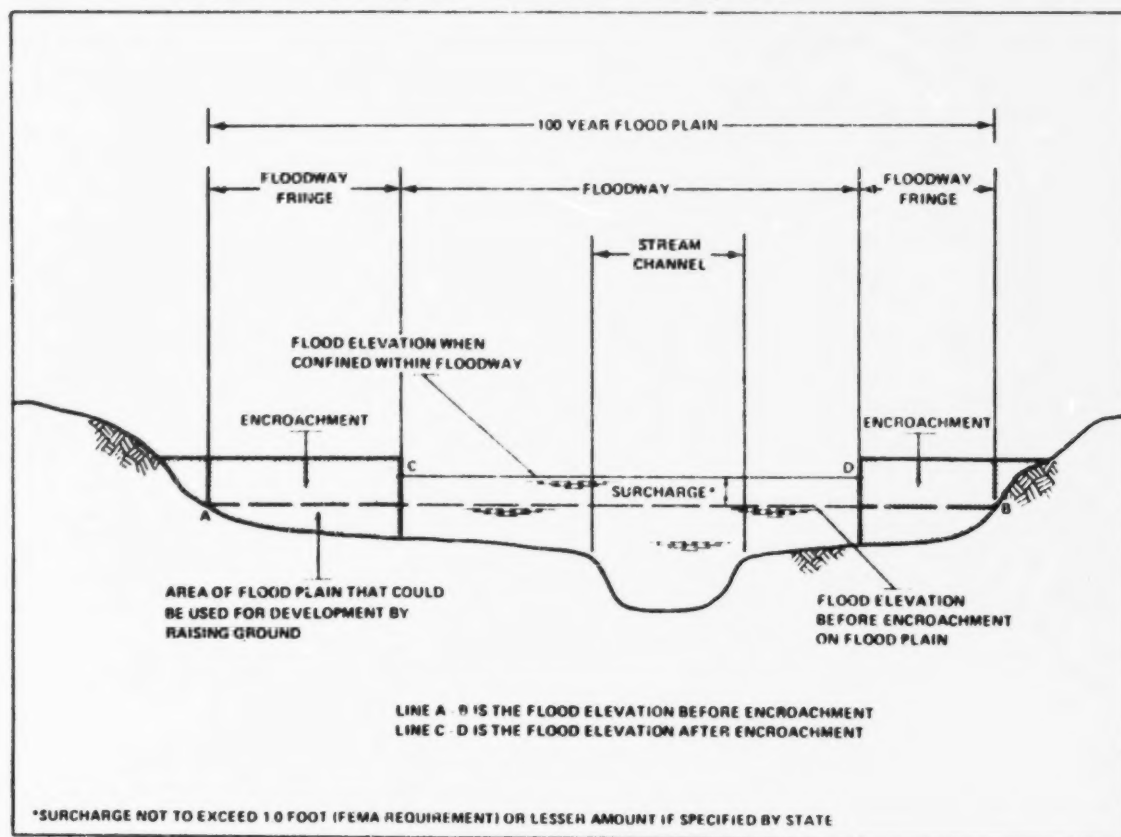
4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The

floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodways are shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway widths for the Bladens River and the Wepawaug River extend beyond the corporate limits.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.



FLOODWAY SCHEMATIC

- Figure 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (INCH)	WITHOUT FLOODWAY (INCH)	WITH FLOODWAY (INCH)	INCREASE (FEET)
BLADEN RIVER								
A	1,600	85 ²	217	0.0	230.6	230.6	230.6	0.0
B	1,800	90 ²	246	7.4	240.6	240.6	240.6	0.0
C	1,900	101 ²	214	0.0	241.6	241.6	241.6	0.0
D	1,940	196 ²	956	2.1	246.0	246.0	246.0	0.0
E	1,940	120 ²	228	9.6	249.9	249.9	250.6	0.7
F	1,625	98 ²	227	0.4	259.0	259.0	259.0	0.0
G	1,700	98 ²	228	0.3	259.0	259.0	259.0	0.0
H	1,740	257 ²	2,272	2.6	259.9	259.9	259.9	0.0
I	1,830	295 ²	2,480	0.6	259.0	259.0	259.0	0.0
J	1,840	55	228	7.4	257.2	257.2	257.2	0.0
K	1,890	59	184	5.2	258.2	258.2	258.2	0.0
L	1,930	91	246	2.8	273.1	273.1	273.1	0.0
M	7,220	137	1,113	0.9	280.5	280.5	281.5	1.0
N	8,800	12	79	12.0	312.1	312.1	312.4	0.3
O	9,770	28	91	10.4	341.1	341.1	341.4	0.3
P	9,800	30	116	8.2	341.7	341.7	342.3	0.6
Q	9,860	248	274	3.5	348.7	348.7	348.7	0.0
R	12,185	211	250	1.6	351.1	351.1	351.6	0.5
S	12,200	211	249	1.6	351.1	351.1	351.6	0.5

¹Feet above corporate limits

²This width extends beyond corporate limits

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

FLOODWAY DATA

BLADEN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FT.)	CROSS AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (INCH)	WITHOUT FLOODWAY (INCH)	WITH FLOODWAY (INCH)	INCREASE (FEET)
BLADENS RIVER (CONTINUED)								
F	12,250	265	870	0.8	251.1	251.1	251.0	0.1
WEPAWAUG RIVER								
A	0	1957	1,242	1.5	194.5	194.5	194.9	0.4
B	4,000	192	357	5.2	197.7	197.7	198.5	0.8
C	6,700	72	228	5.8	205.2	205.2	205.7	0.5
D	6,850	56	252	7.2	205.7	205.7	206.2	0.5
E	6,925	80	522	3.0	209.9	209.9	209.9	0.0
F	7,200	104	421	4.5	210.0	210.0	210.0	0.0
G	8,200	185	565	2.3	210.7	210.7	211.2	0.5
H	8,600	35	603	2.2	210.7	210.7	211.4	0.7
I	8,680	143	638	2.0	211.3	211.3	211.6	0.3
J	10,100	150	413	3.2	212.9	212.9	213.1	0.2
K	12,220	176	304	4.3	218.3	218.3	219.1	0.8
L	12,250	169	305	4.3	219.3	219.3	219.5	0.2
M	12,400	272	569	2.3	220.6	220.6	220.6	0.0
N	12,500	211	281	4.6	220.9	220.9	220.9	0.0
O	12,560	382	1,009	0.6	223.3	223.3	224.3	1.0

¹Feet above corporate limits

²This width extends beyond corporate limits

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

FLOODWAY DATA

BLADENS RIVER AND WEPAWAUG RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Wepawaug River (continued)								
P	13,460	14	57	11.5	224.7	224.7	225.4	0.7
Q	14,560	58	193	3.4	231.7	231.7	232.6	0.9
R	14,630	12	222	2.9	231.8	231.8	232.7	0.9
S	14,690	254	881	0.7	238.1	238.1	238.1	0.0
T	16,290	39	79	8.3	253.5	253.5	253.5	0.0
Race Brook								
A	0	15	72	8.8	172.3	172.3	173.3	1.0
B	2,180	49	112	5.6	189.4	189.4	189.7	0.3
C	2,300	49	90	7.0	190.4	190.4	190.5	0.1
D	2,620	18	92	6.9	193.5	193.5	194.5	1.0
E	2,685	18	94	6.7	193.8	193.8	194.8	1.0
F	3,300	25	67	9.4	206.3	206.3	206.3	0.0
G	3,450	28	93	6.8	208.3	208.3	208.3	0.0
H	3,735	24	74	8.5	211.5	211.5	211.5	0.0
I	4,250	29	99	6.4	214.0	214.0	214.0	0.0
J	5,300	43	81	7.8	226.8	226.8	226.8	0.0
K	5,450	61	93	6.8	231.4	231.4	231.4	0.0

¹Feet above corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

FLOODWAY DATA

WEPAWAUG RIVER AND RACE BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Race Brook (continued)								
L	6,750	57	181	3.5	241.3	241.3	241.8	0.5
M	8,560	70	59	10.7	252.0	252.0	252.5	0.5
N	8,600	70	75	8.5	252.5	252.5	253.5	1.0
O	8,650	439	1,158	0.5	255.1	255.1	255.1	0.0
P	9,300	133	170	3.7	256.9	256.9	256.9	0.0
Q	9,350	143	342	1.8	260.1	260.1	260.1	0.0
R	10,500	25	77	8.2	269.8	269.8	269.9	0.1
S	10,540	32	103	6.1	270.8	270.8	270.8	0.0

¹Feet above corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

FLOODWAY DATA

RACE BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
West River								
A	377	74	404	5.6	81.9	81.9	82.7	0.8
B	1,520	50	306	7.4	84.2	84.2	85.1	0.9
C	2,260	214	1,541	1.5	87.7	87.7	88.2	0.5
D	3,400	540	3,287	0.7	87.8	87.8	88.5	0.7
E	5,600	770	3,473	0.6	87.8	87.8	88.5	0.7
F	6,800	565	2,027	1.1	88.0	88.0	88.7	0.7
G	7,740	382	1,092	2.1	88.6	88.6	89.5	0.9
H	8,750	313	766	2.5	92.2	92.2	93.2	1.0
I	10,245	68	214	8.9	107.2	107.2	107.2	0.0

¹Feet above corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

FLOODWAY DATA

WEST RIVER

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

A Flood Insurance Study has been prepared for the Town of Bethany (Reference 11). The results of this study are in general agreement with the results of that study.

A Flood Insurance Study has been prepared for the City of New Haven (Reference 8). The results of this study are in exact agreement with the results of that study.

A Flood Insurance Study has been prepared for the Town of Orange (Reference 12). Because of differing scopes of study, the results of this study are not in exact agreement with the results of that study.

Because it is based on more up-to-date analyses, this study supersedes the previously printed Flood Insurance Study for the Town of Woodbridge (Reference 10).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, J. W. McCormack Post Office and Courthouse Building, Room 462, Boston, Massachusetts 02109.

9.0 BIBLIOGRAPHY AND REFERENCES

1. State of Connecticut, State Register and Manual, Hartford, Connecticut, 1978.
2. State of Connecticut, Geological and Natural History Survey, The Climate of Connecticut by J. J. Brumbach, Storrs, Connecticut, 1965.
3. American Society of Civil Engineers, Watershed and Management Symposium, Irrigation and Drainage Division, Flood Flow Formulas for Urbanized and Nonurbanized Areas of Connecticut by L. A. Weiss, Logan, Utah, 1975.
4. Milford Engineering Associates, Study of Flooding Conditions in the Woodbridge Flats, Drawing Set 1 (West River Cross Sections), April 1981.
5. Topographic Map, Town of Woodbridge, Connecticut, Southeastern Section, Amity Road to Litchfield Turnpike Areas, Scale 1"=100', Contour Intervals 1 and 2 Feet, prepared from aerial photographs flown on April 8, 1981.

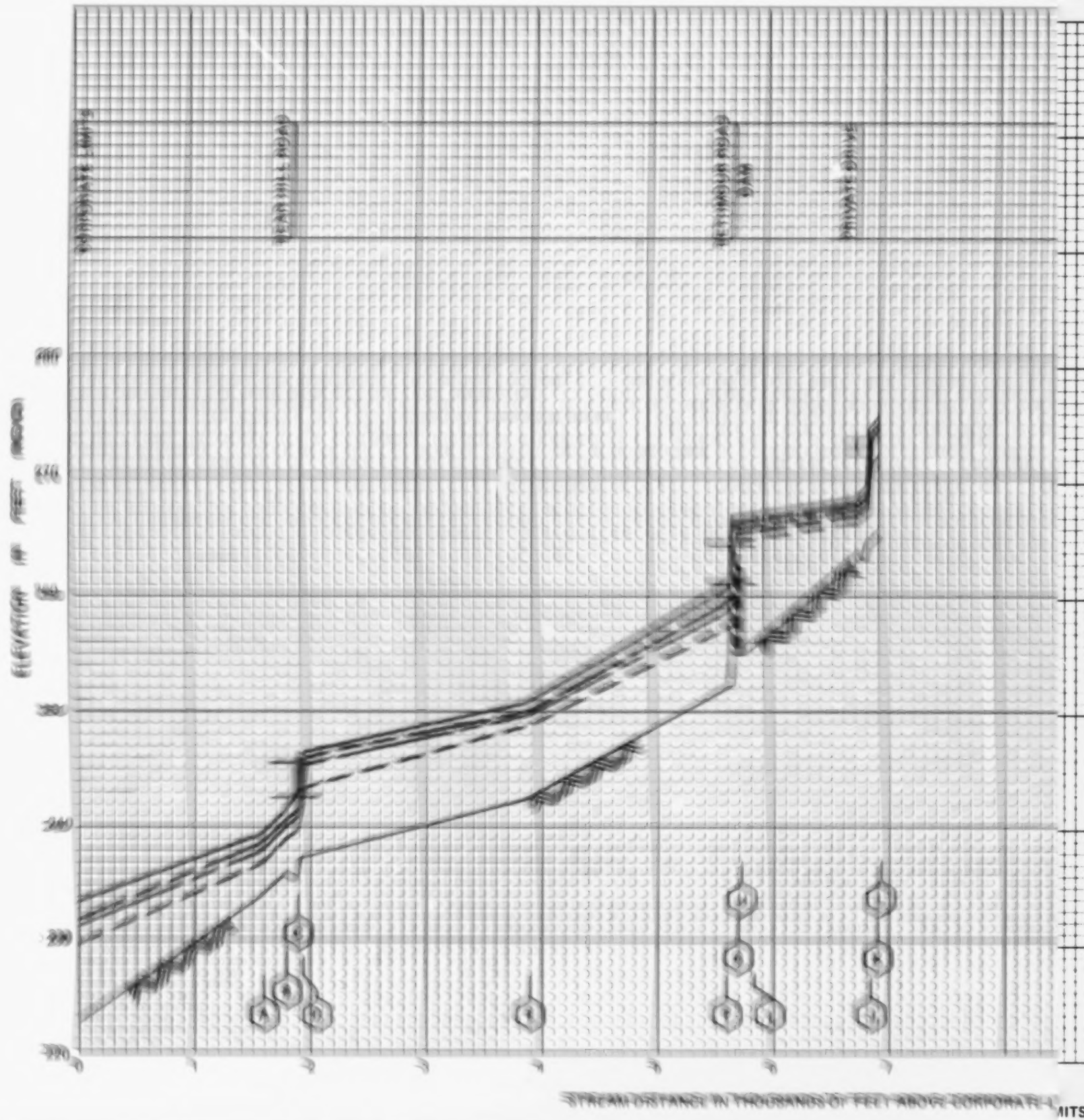
6. U. S. Department of the Interior, Geological Survey, Open-File Report 76-499, Computer Program E431, Users Manual, Computer Applications for Step-Backwater and Floodway Analyses by James O. Shearman, Washington, D. C., 1976.
7. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, April 1984.
8. Federal Emergency Management Agency, Flood Insurance Study, City of New Haven, New Haven County, Connecticut, Washington, D. C., May 2, 1983.
9. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: Ansonia, Connecticut, 1964, Photorevised 1972; Mount Carmel, Connecticut, 1967, Photorevised 1972; Naugatuck, Connecticut, 1964, Photorevised 1972; New Haven, Connecticut, 1967, Photorevised 1972.
10. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Woodbridge, New Haven County, Connecticut, Washington, D. C., September 16, 1980 (Flood Insurance Rate Map dated March 16, 1981).
11. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Bethany, New Haven County, Connecticut, Washington, D. C., December 2, 1980.
12. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Orange, New Haven County, Connecticut, Washington, D. C., March 18, 1980.

EXHIBIT 3 - ELEVATION REFERENCE MARKS

<u>Reference Mark</u>	<u>FINN Panel</u>	<u>Elevation (Foot NGVD)</u>	<u>Description of location</u>
RM 1	01	210.55	Nail in first guardrail, approximately 200 feet west of Woodbridge-Seymour corporate limits on south side of southbound lane of State Route 25.
RM 2	01	211.65	Shaded square on downstream left abutment of State Route 25 bridge over the Wapahung River.
RM 3	01	210.547	USGS bronze disk stamped 211.547 on top of reinforced concrete post, flush with ground, on west side of State Route 11, approximately 0.3 mile north of its intersection with State Route 25, approximately 18.20 feet west of centerline of road.
RM 4	01	210.46	Nail on downstream left falling support on private bridge over the Wapahung River at State Route 11.
RM 5	01	210.10	Shaded square on upstream right corner of abutment of State Route 11 bridge over the Wapahung River.
RM 6	01	210.11	Shaded square on left support on abutment of State Route 11 bridge over the Wapahung River.
RM 7	02	229.21	Nail in SHUTO pole No. 123 at Woodbridge-Seymour corporate limits.
RM 8	02	225.23	Shaded square on downstream left corner of abutment on Bear Hill Road bridge over the Bladen River.
RM 9	02	266.36	USGS bronze disk stamped 266.36 on top of reinforced concrete post, approximately 4 inches below ground, on northeast side of State Route 87, approximately 2.33 miles west of intersection with State Route 83, on bank between shoulder of road and stone wall, approximately 21.5 feet northwest of centerline of State Route 87 and in front of barn.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

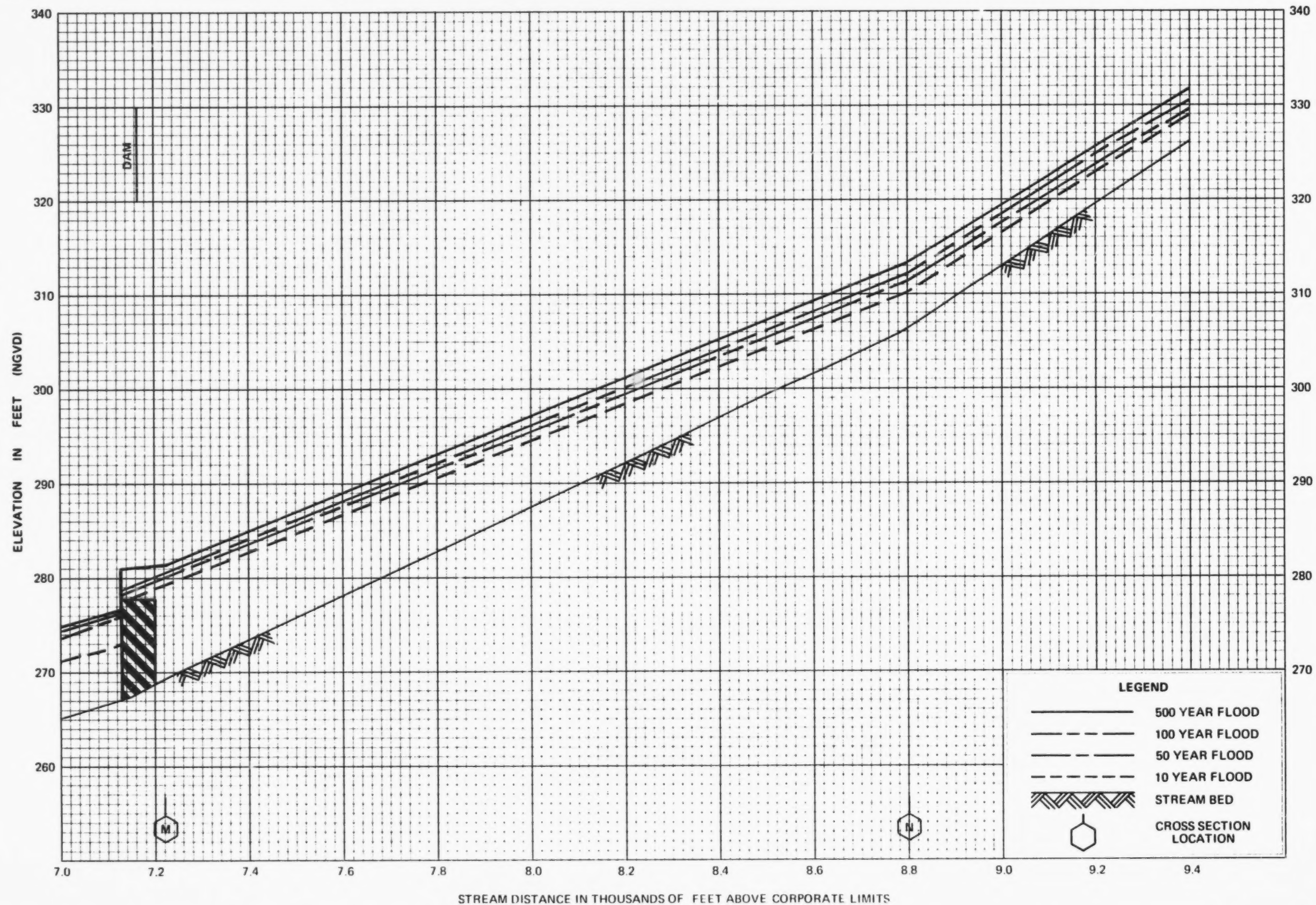
<u>Reference Mark</u>	<u>FIRM Panel</u>	<u>Elevation (Foot NGVD)</u>	<u>Description of location</u>
RM 10	02	266.04	Chiseled square approximately 3 feet from upstream left end of headwall on Baltimore Road bridge over the Bladens River.
RM 11	02	279.96	Nail approximately 2 feet above ground on east side of pole No. 813 on State Route 67, approximately 25 feet downstream of dam.
RM 12	02	342.82	Chiseled square on upstream left abutment on Sanford Road bridge over the Bladens River.
RM 13	02	333.55	Nail approximately 6 inches off ground in center pole No. 280 on State Route 67.
RM 14	03	334.60	Nail in tree approximately 20 feet south of south side of eastbound lane of State Route 67, near base creek culvert.
RM 15	03	315.16	Chiseled cross in rock approximately 15 feet left of downstream abutment on base creek, near culvert on pole corner.
RM 16	03	329.38	Nail approximately 1 foot above ground in west side of stream pole No. 2031 on State Route.
RM 17	03	255.20	Chiseled square on upstream right corner of headwall of State Route 205 bridge over base creek.
RM 18	03	271.19	Chiseled square on downstream left abutment of State Route 313 bridge over base creek.



LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOOD PROFILES
	BLADENS RIVER
TOWN OF WOODBRIDGE, CT (NEW HAVEN CO.)	
01P	



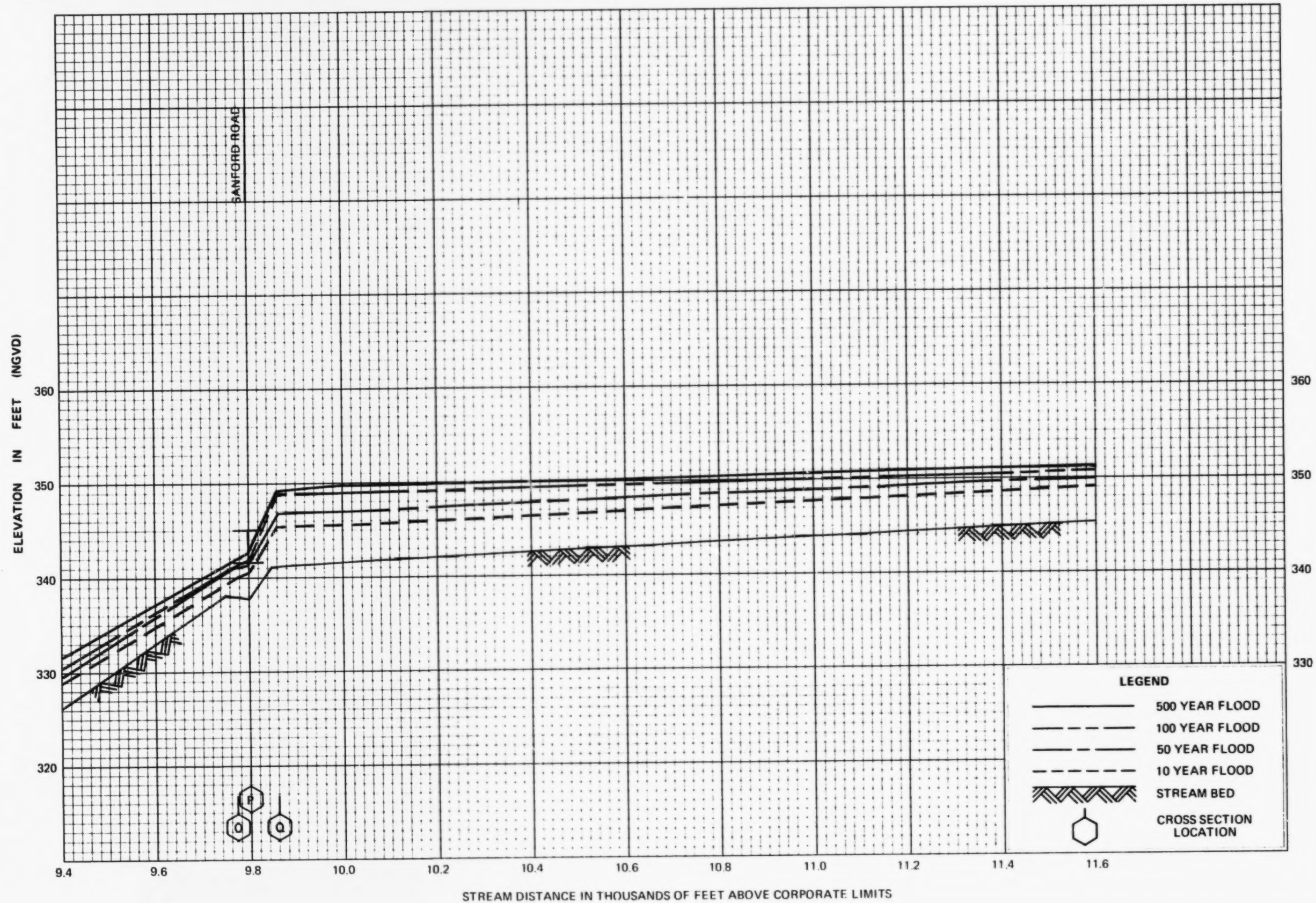
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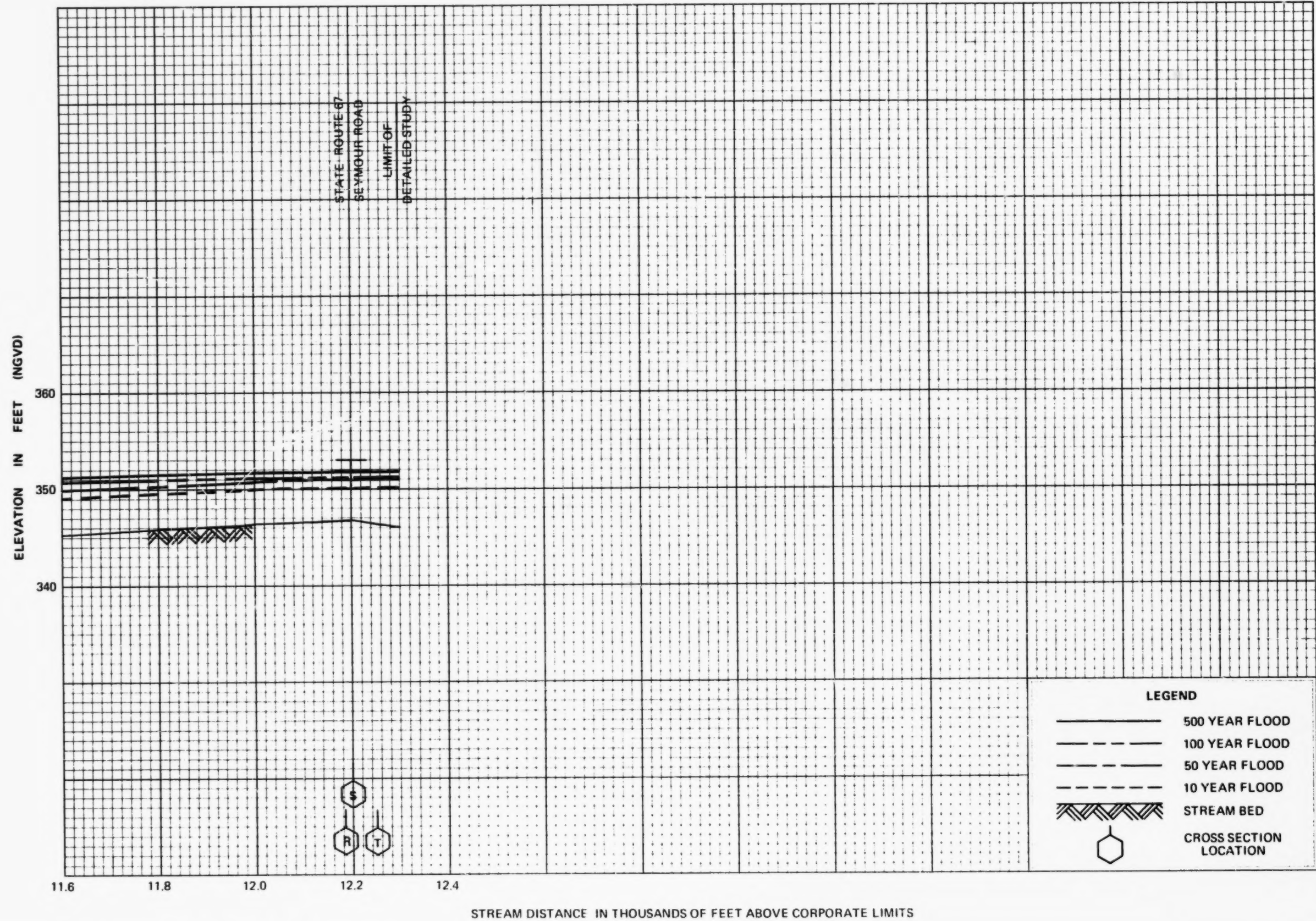
BLADENS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

02P





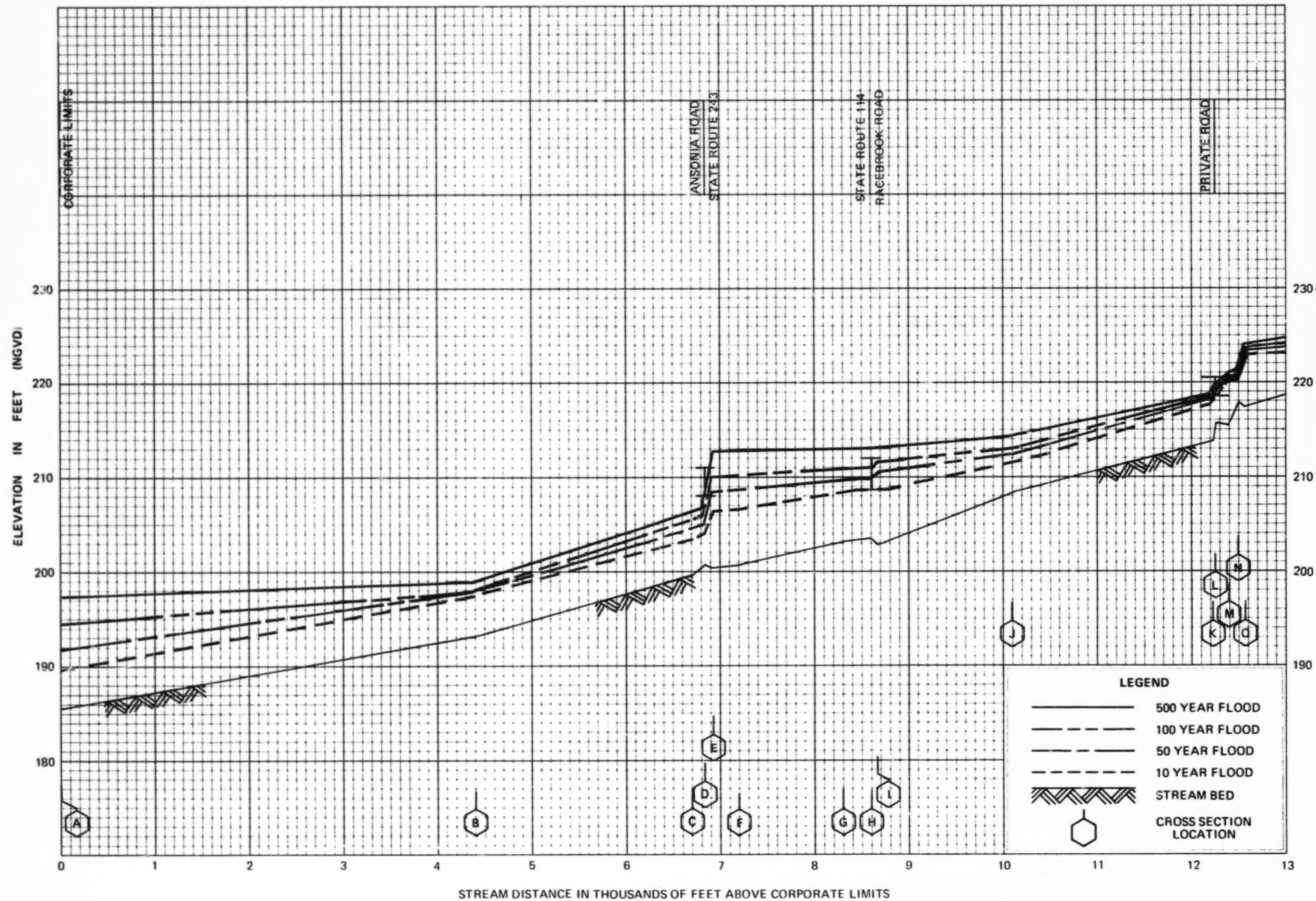
FLOOD PROFILES

BLADENS RIVER

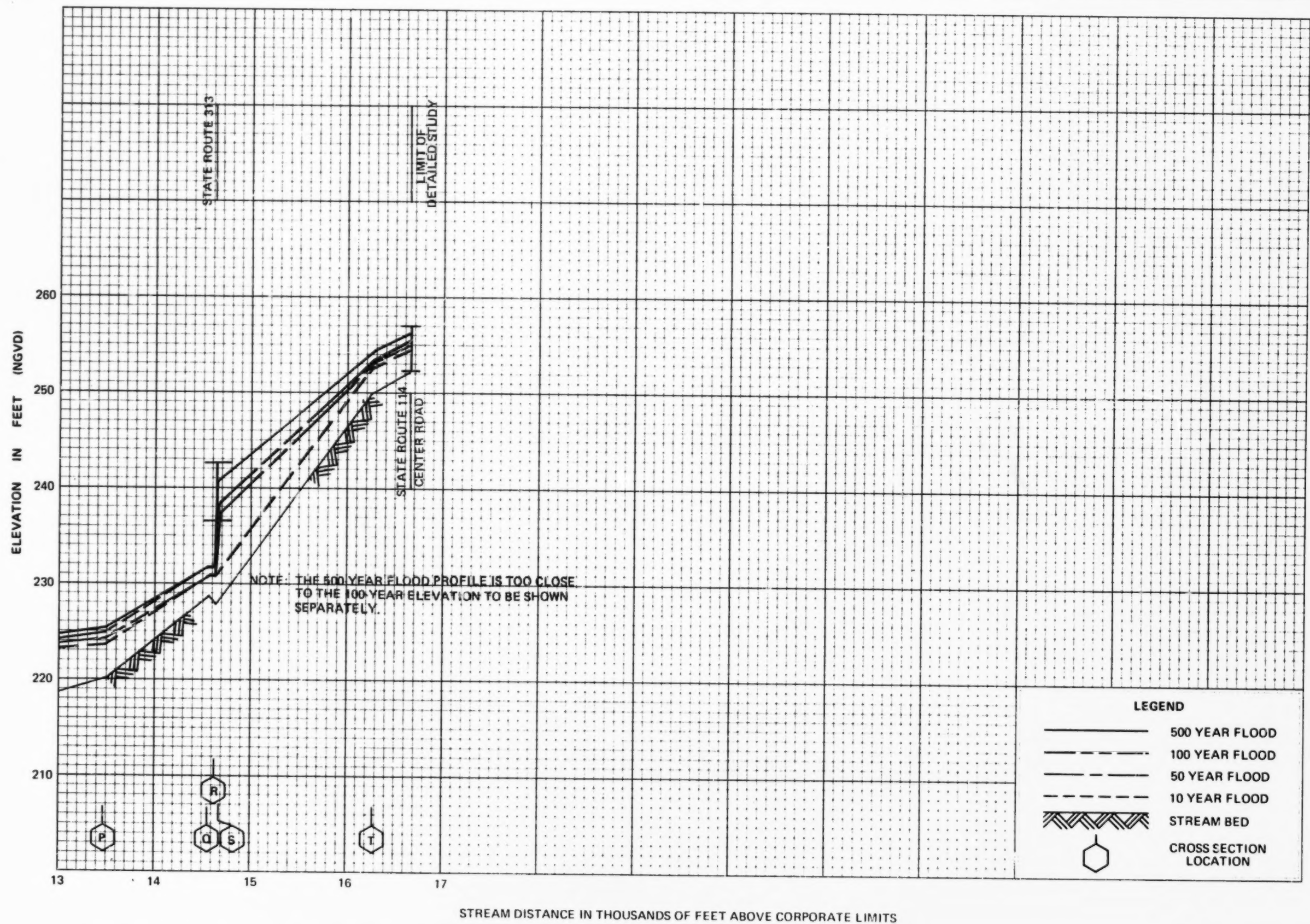
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

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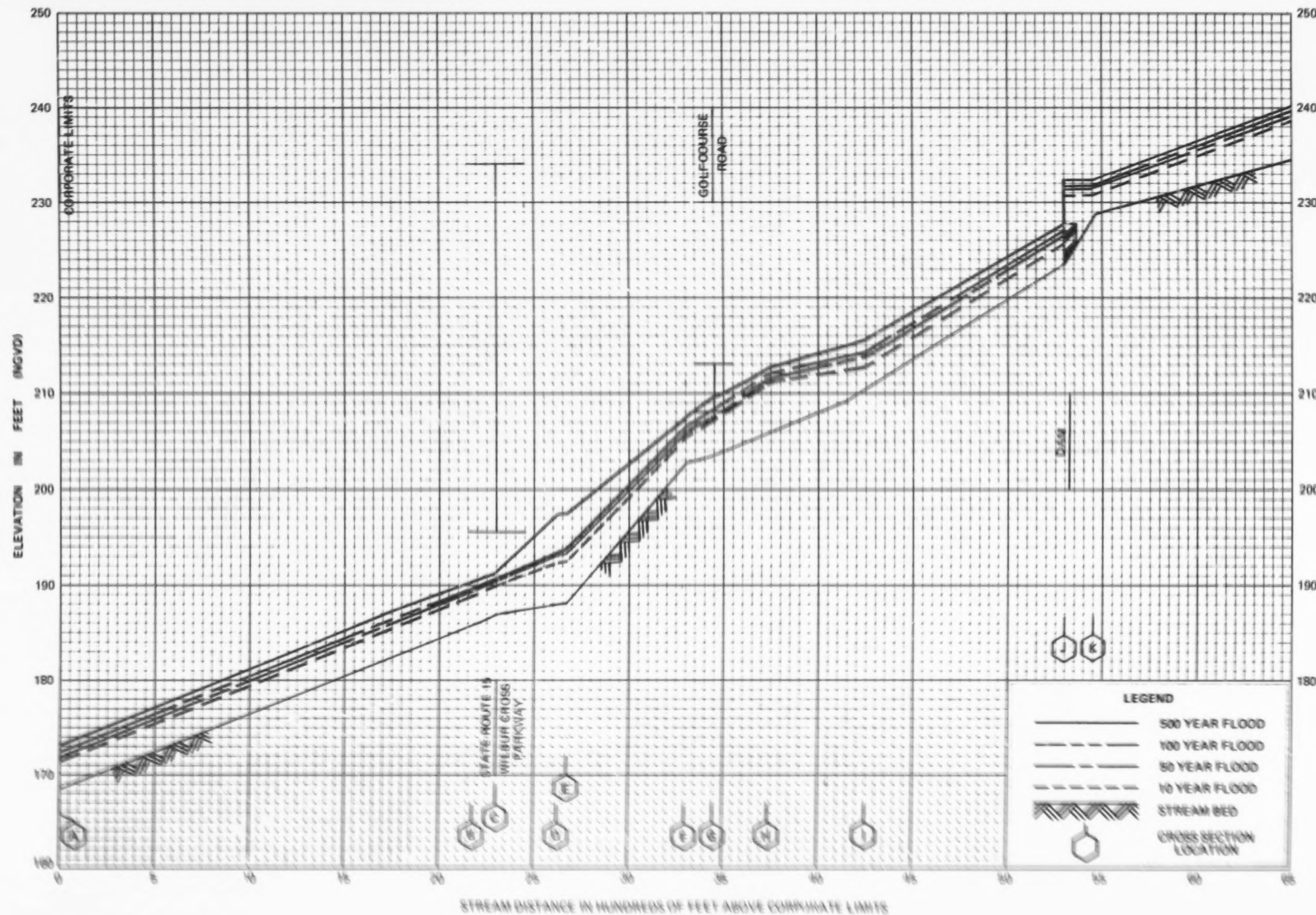
FLOOD PROFILES

WEPAWAUG RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

06P



STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CORPORATE LIMITS

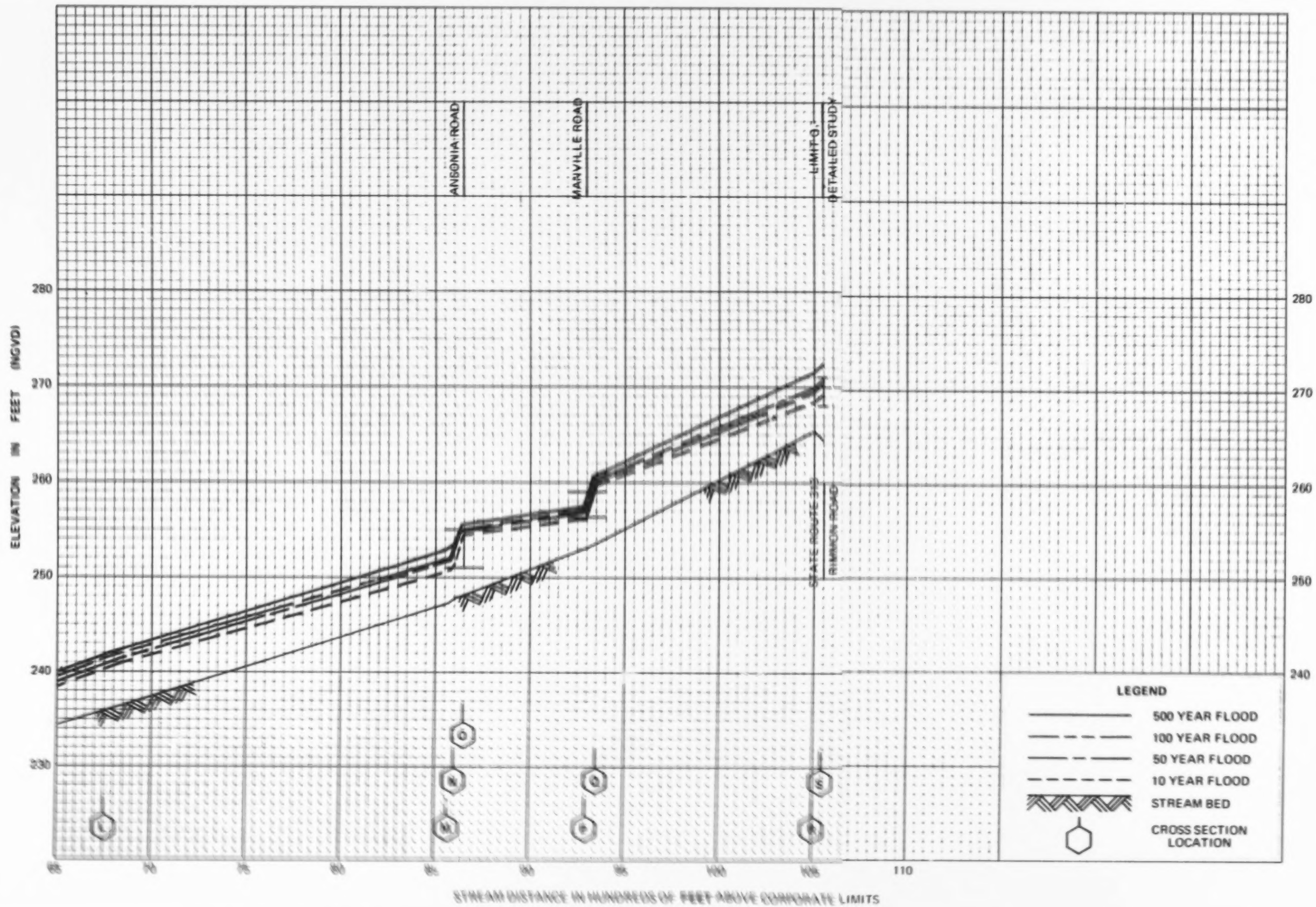
FLOOD PROFILES

RACE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

07P



FLOOD PROFILES

RACE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

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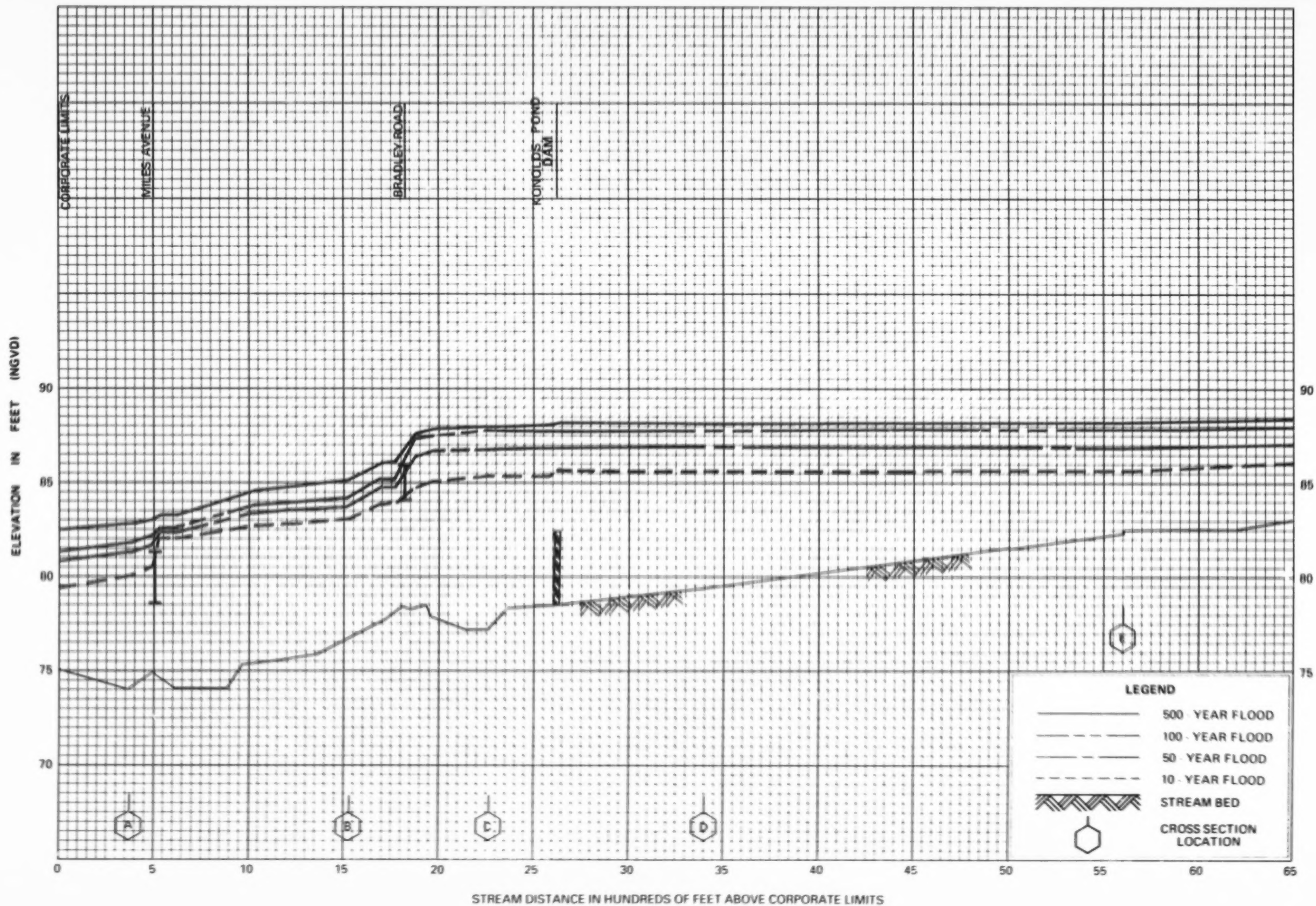
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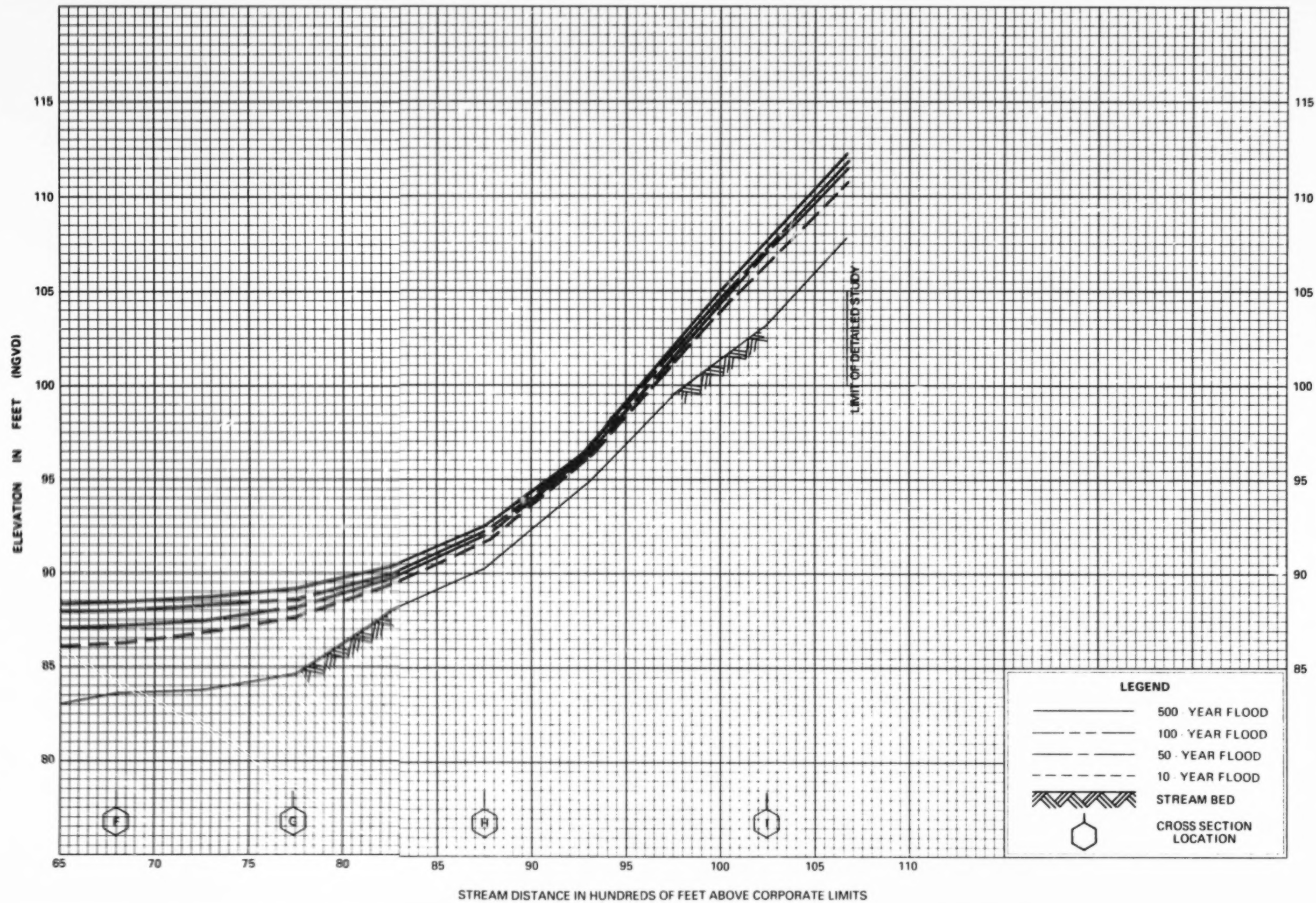
WEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)

09P





FLOOD PROFILES

WEST RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WOODBRIDGE, CT
(NEW HAVEN CO.)